

## RESEARCH ARTICLE

## Prescription Writing Errors in Clinical Clerkship among Medical Students

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### Abstract

Prescription is an instruction written by a medical practitioner to give a drug or device for a patient. The proper prescription will contribute to speedy recovery or healing process for the patient. Clinical clerkship must have an excellent competency to choose the right medication and prescribe the appropriate drugs or therapy. This study aims to analyze the common error in prescription's writing in clinical clerkship among medical students at their final examination to be a medical doctor. This study used the analytic method to 609 sheets of prescription from 180 clerkship students in their last try out on objective structured clinical examination (OSCE) at the Faculty of Medicine Universitas Islam Bandung in March 2018. Analyzed the component that every prescription should have, which consists of patient identity, superscription, inscription, subscription, and signatures. The result showed that more than half of the clerkship students made an error in subscription (50.25%) and signatures items (55.83%), while most of them had written down properly the patient identity (77.5%), superscription (83.74%), and inscription (78.98%). As a result, with more than half error in a prescription written in subscription and signature item, the failure of giving adequate therapy will cause a low recovery or healing process to the patients. Moreover, it may harm or cause death to the patients. In conclusion, more than half of medical students made common errors in prescription's writing.

**Key words:** Clerkship, error, prescription

## Kesalahan Penulisan Resep pada Mahasiswa Koasistensi Fakultas Kedokteran

### Abstrak

Resep merupakan instruksi yang ditulis oleh tenaga medis untuk memberikan obat atau seperangkat alat kepada pasien. Peresepan yang tepat akan membawa proses pemulihan dan penyembuhan terhadap pasien. Mahasiswa kedokteran yang menjalankan masa koasisten harus memiliki kompetensi yang baik untuk memilih dan menuliskan terapi yang sesuai. Penelitian ini bertujuan menganalisis kesalahan umum dalam penulisan resep pada mahasiswa kedokteran yang akan menghadapi ujian akhir untuk menjadi seorang dokter. Penelitian ini menggunakan metode analitik terhadap 609 lembar resep dari 180 mahasiswa kedokteran yang sedang melaksanakan *try out* akhir *objective structured clinical examination* (OSCE) di Fakultas Kedokteran Universitas Islam Bandung pada Maret 2018. Dianalisis setiap komponen yang harus ada dalam penulisan resep, yaitu identitas pasien, superskripsi, inskripsi, subskripsi, dan *signature*. Hasil penelitian menunjukkan bahwa lebih dari setengah mahasiswa melakukan kesalahan pada item subskripsi (50,25%) dan *signature* (55,83%), sedangkan sebagian besar sudah menulis dengan baik pada item identitas pasien (77,5%), superskripsi (83,74%), dan inskripsi (78,98%). Akibatnya, dengan lebih dari setengah jumlah kesalahan dalam penulisan item subskripsi dan *signature* maka kegagalan dalam memberikan terapi yang adekuat dapat menyebabkan angka kesembuhan yang rendah, terlebih lagi dapat menimbulkan bahaya bahkan kematian terhadap pasien. Simpulan, lebih dari setengah mahasiswa kedokteran melakukan kesalahan umum dalam penulisan resep.

**Kata kunci:** Kesalahan, koasisten, resep

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## Introduction

The Institute of Medicine estimated that more than 1 million preventable adverse events occur each year in the United States. That report also estimated that, in the United States, up to 98,000 annual deaths can be attributed to medical errors, with errors and preventable deaths costing \$30 billion annually in lost income and excess health care expenditures. Historically, errors in medicine were thought to be an unavoidable outcome of learning to practice medicine.<sup>1</sup>

Today, most experts agree that a majority of medical errors are attributable to faulty systems, processes, and conditions rather than the failure of individuals. However, some argue that at the same time we emphasize the way systems can lead to errors, it also is essential to create an environment in which medical students and house officers can discuss and learn from individual mistakes, and learn how to report and respond to such mistakes.<sup>2</sup>

Drug-related problems are one of the most common reasons for hospitalization, and most of these problems are considered to be avoidable. In turn, a significant proportion of drug-related problems are due to prescription errors. Frequent mistakes relate to over-medication, under-medication, the prescription of non-indicated drugs, wrong doses, or ambiguous dosage ordering.<sup>3</sup>

The prescription is an instruction written by a medical practitioner to give a drug or device for a patient. Prescription writing is one of the most critical activities in the health care system of every country. Most of the physicians demonstrate their skills by writing a prescription, which considered as the first step of medical intervention.<sup>4,5</sup>

The prescription writing is a complex and challenging skill which depends on the physician's diagnostic skills, comprehensive pharmacological knowledge, communication skills, understanding of the principles of clinical pharmacology, the ability to make decisions regarding the potential risks vs benefits, and clinical experiences. The proper prescription will support recovery or healing process for the patient. Medication errors in hospitals have been reported to occur with alarming frequency with the vast majority involving junior doctors recently graduating from medical school.<sup>4,5</sup>

The prescribing errors have classified into different categories based on knowledge, rules,

action, and memory. The knowledge-based errors reflect a lack of experience or understanding of specific medications. Rule-based errors reflect the lack of application of the fundamental rules. Action-based errors are those not intended (e.g., misspelling or mistaken drug name). Memory-based errors involve forgotten information (e.g., patient allergy).<sup>6</sup>

Clerkship students must have an excellent competency to choose the right medication and write down an appropriate drug or therapy. Recently graduated doctors are known to be most prone to committing prescription errors. Medical students are generally expected to acquire their prescribing skills during clerkships.<sup>2</sup> Interestingly, there are currently no data available regarding the validity of this assumption. Therefore, in this study, we refer to analyze a standard error in prescription's writing in clerkship students at their final examination to be a medical doctor.

## Methods

Every medical student requires to complete clinical clerkships during their education before the national final examination. Students completed the clinical clerkships periods in the teaching hospitals. The theory supporting this type of design is that when participants are asked to respond clinical cases about how much they know about a particular subject after they have some basic knowledge of the subject itself, they are better able to accurately give accurate diagnosis and therapy based on their knowledge during the clinical clerkship's periods.

During the test, students were required to complete a patient's management based on the case include prescribing within a timeframe of 10 minutes per case. Study participation was voluntary, and the local ethics committee approved the study protocol.

We used the analytic method to 609 sheets of prescription from 180 clerkship students in their last try out the objective structured clinical examination (OSCE) at the Faculty of Medicine Universitas Islam Bandung in March 2018. We analyze the component that every prescription should have, which consists of patient identity (name, age, gender and occupation), superscription (writing R/symbol which means "take"), inscription (drug or medication prescribed), subscription (direction to pharmacist) and signature (direction how to

use drug for the patient).

The statistical package of social sciences (SPSS/PC) version 17 used for data entry and analysis. Calculations based on the table of proportions evaluation. We compared the averages of each group using this statistical analysis.

This study started after obtaining ethics approval from the Health Research Ethics Committee of Faculty of Medicine, Universitas Islam Bandung.

## Results

Based on the Table, it could be concluded that most candidates wrote complete identities (77.5%), superscriptions (83.74%), and inscriptions (78.98%). Nearly half of clerkship students made an error in subscription (50.25%) and signature items (55.83%). Incompleteness dominates in terms of writing signature and subscription.

## Discussion

Medication errors may have devastating, far-reaching consequences, not limited solely to patients and their families. Many medication errors result from prescribing errors, which have an increased potential for serious complications. Prescribing errors have classified into different categories based on knowledge, rules, action, and memory.<sup>6</sup>

One study found that most prescribing errors attributed to (1) lack of information about the patient; (2) specific drug therapy (e.g., narrow therapeutic index medications); or (3) inability to incorporate patient-specific factors (e.g., declining renal function) to appropriate selection and dosing of drug therapy. Other errors result from miscalculations, improper use of decimal points, unit or rate expressions, and nomenclature.<sup>6</sup>

Medication errors cause many adverse drug events (ADEs). Many of these medication errors are due to errors in prescription writing, like illegibility, ambiguous abbreviations, lack of date of prescription, dose, route, frequency of administration, and duration of treatment. Prescription writing and audits taught to students as a part of the curriculum.<sup>6</sup>

Clerkships constitute an integral part of medical education, although it is not sufficient to rely on students systematically practicing skills as intended. Given the pivotal importance of patient safety for good clinical practice, correct prescribing represents a critical skill that trained at medical schools.<sup>2</sup>

Several studies have shown that structured problem-based training improves medical student's ability to prescribe correctly. Problem-based training with a focus on common prescription errors can reduce average error rates by more than 50%, independently of the clinical context. The students need to clear a practical examination conducted by the university that includes prescription writing.<sup>2,6</sup>

There are a general perception and concern that most medical schools neither provide adequate training opportunities nor carry out a robust assessment of students in drug prescribing skill. As a consequence of these curricular issues, new doctors are underprepared to take on prescribing responsibilities after graduation. Various models of teaching/learning clinical pharmacology and therapeutics proposed.<sup>7</sup>

Every prescription is a legal document, in which considering all medication characteristics is necessary; therefore, the error-free spelling of the full name of drugs, legibility, dosage form, strength, quantity, and proper instructions are of high significance. A typical drug prescription has standard components which fall into three categories: patient-related (name, age, and gender), physician-related (the identity of the prescriber) and drug-related (drug

**Table Proportion of Prescription Writing Completeness**

Terms	n=609	Percentage
Patient identity		
Not complete	137	22.50
Complete	472	77.50
Superscription		
Not complete	99	16.26
Complete	510	83.74
Inscription		
Not complete	128	21.02
Complete	481	78.98
Subscription		
Not complete	306	50.25
Complete	303	49.75
Signature		
Not complete	340	55.83
Complete	269	44.17

name, dose, formulation, route and frequency of administration, quantity to be dispensed, duration of treatment and directions for use).<sup>5,7,8</sup>

From the research result, nearly half of clerkship students made an error in subscription (50.25%) and the signature items (55.83%). Incompleteness dominates in terms of writing signature and subscription. Studies have shown that in about half of hospital admissions, physicians may make one prescribing error or the other. Errors are more likely to occur with junior doctors but are still prevalent in other senior categories of doctors. Errors in prescribing attributed to a variety of factors including individual, environmental, and organizational such as lack of knowledge, insufficient training, workload, and communication. Some researchers have reported that foundation (intern) year doctors lack confidence in prescribing several groups of medicines with the majority of them feeling that undergraduate education in clinical pharmacology and therapeutics had not prepared them adequately for prescribing duties.<sup>9</sup>

An error occurring at prescriptions writing stage may fail the therapy or may cause harm to the patient. Medication errors are recognized to be a significant impediment in providing optimum medical care to the patients. These errors harm patient's health and therefore should minimize.<sup>5-7</sup> Medication errors can give rise to adverse events too. In one study, 11% of adverse events were due to medication errors.<sup>10</sup>

Conventionally, all newly graduated clerkship students are required to undergo internship in accredited hospitals for a year before full registration to practice after they passed the national final board examination. The internship is a period of medical apprenticeship under the supervision of a consultant. The intern is expected to learn clinical skills, perform some clinical procedures, and demonstrate sound clinical judgment to arrive at patient management decisions. Junior doctors are the most frequent prescribers in the hospital setting and are reported to make most of the prescribing errors. Knowing what drug to prescribe to which the patient does not necessarily translate to proper prescription. Because junior doctors make the majority of prescription-related errors in the hospital environment, it is necessary to educate the clerkship student before internship periods and develop interventions that will improve the prescribing qualities. The broad aims of medical

school training are to lay the foundation for a medical career and to provide junior doctors with appropriate knowledge and skills for the first stage of their post-qualification career.<sup>9</sup>

The Faculty of Medicine Universitas Islam Bandung introduced patient safety teaching into the preclinical curriculum. The curriculum of this institution has developed included problem identification, needs assessment, development of goals and objectives, choosing educational strategies, implementation, evaluation, and feedback. The institution sought an experiential learning environment to ground its curriculum in problem-based learning.

Our findings may help to explain how much clerkships student error in prescription writing in subscription and signature item. With more than half error in prescription writing in subscription and signature item, the failure of giving adequate therapy will cause a low recovery or healing process to the patients, moreover, it may harm or cause death to the patients.<sup>2</sup>

From Ajemigitse et al.<sup>9</sup> study, factors that could contribute to the possibility of prescribing errors occurring in the practice environment were; respondents considered workload (23, 76.7%), multitasking (19, 63.3%), rushing (18, 60%) and tiredness or stress (16, 53.3%) as important contributory factors. Other factors mentioned were a distraction (11, 36.7%), low morale (9, 30%), unfamiliar patient, busyness and no senior support (8, 26.7%) each, being nervous or confused (5, 16.7%) and time in the day (2, 6.7%). In this study setting, the error of prescription writing maybe has caused by time-limited and personal stress of final examination setting. The stress and performance anxiety involved with summative examinations could adversely affect decision-making abilities and the student's ability to writing the prescriptions effectively.<sup>5</sup>

Ideally, when clinical cases occur in the hospital, clerkship students would see appropriate responses and accurate prescription to handle the case by more senior clinicians. Observing senior physicians is a significant way in which medical students and young physicians learn appropriate behaviors. Clinical clerkship students can not only learn about the scientific and medical issues surrounding the safety error but also learn about the appropriate way to disclose and write an accurate prescription to the patients.<sup>2,11</sup>

Seiden et al.<sup>12</sup> suggest that training medical

students about the prevention and reporting of errors can help ensure patient safety. After analyzing a series of case studies in which medical students helped avert errors, they argue that since medical students have sufficient knowledge to recognize most error types and are responsible for the care of fewer patients, they can give more considerable attention to the details of clinical care and are a valuable, but untapped, resource for improving patient safety.<sup>2</sup>

Clerkship students need to practice these skills for themselves. Concerning patient safety and ensuring proper clinical practice among young doctors, specific training modules for writing good and a complete prescription within medical education would seem required on medical education universities. Medical teaching institution needs to develop an innovative and experiential curriculum that can be successfully delivered the medical students during a clinical clerkship and results changes in student ability to prescribe after they pass the final examination and become a doctor.

With more than half error in prescription writing in subscription and signature item, the failure of giving adequate therapy will cause a low recovery or healing process to the patients. Moreover, it may harm or cause death to the patients.

This study assessed the prescriptions-error of clerkship students. Results will be added to other evidence to serve as part of a needs assessment for future training. The authors intend to create and offer a prescription-error educational session explicitly designed for clerkship students. However, further research is needed to determine the most appropriate teaching methods to increase prescribing ability. Future studies not only will serve to enhance professional education, but also optimize patient medication safety.

It is essential to critically examine the level of prescribing competence expected from students at different stages of the program. We need to examine what should be the prescribing skill performance standard in preclerkship phase, clerkship phase, and final examination phase for medical students as outcomes.

## Conclusion

As a conclusion of this study was more than half of the clinical clerkship among medical students at their final examination to be a medical doctor

made common errors in prescription's writing.

## Conflict of Interest

There is no conflict of interests.

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